What is the difference between error function, cost function and loss function?

In machine learning the terms error function, cost function and loss function are often used interchangeably. However, there are some subtle differences between them:

- error function: an error function is a mathematical object that measures the difference between two terms;
- cost function: a cost function is similar to an error function but it is often used in optimization problems, where we don't have a target value; we use a cost function to find the set of parameters that results in the lowest possible cost;
- loss function: a loss function is used to measure the difference between a predicted output and the actual one in a machine learning problem.

The loss function is used to compute the error for a single training example; the overall cost function is computed as the average of the loss function over all the training examples.

Error function	mathematical object measuring the error between two instances
loss function	measures the error on a single sample
Cost function	measures the error on the whole batch

The main difference between them is their usage in different context.